The Relationship between Maternal Postpartum Depression/Postpartum Anxiety and Duration of

Breastfeeding

by

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Abstract

Breastfeeding is a vital public health strategy for improving infant morbidity and mortality as well as maternal morbidity outcomes. However, according to the Department of Health and Human Services (2011), U.S. mothers consistently fail to meet the recommended one-year duration of breastfeeding. While extensive literature exists exploring barriers to breastfeeding, there is limited and conflicting research on maternal mental health as a barrier to breastfeeding. The purpose of this study was to determine if mothers who suffer from postpartum depression and/or postpartum anxiety have different breastfeeding duration than mothers who do not. Using a cross-sectional design, a sample ($n = 252$) of mothers from Maryland was analyzed using data from the Centers for Disease Control and Prevention (CDC) Pregnancy Risk and Monitoring System (PRAMS) from 2017 and 2018. It was determined that postpartum anxiety and postpartum depression appear to be independent from duration of breastfeeding. This is in opposition to the current body of literature, and more studies with larger sample sizes are needed to examine the possible relationship between maternal mental health and breastfeeding duration. Specifically, studies that include more questions pertaining to postpartum depression and postpartum anxiety would be beneficial.

Keywords: breastfeeding, postpartum, postpartum anxiety, postpartum depression, maternal mental health

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Introduction

The Healthy People 2020 goal of improving the health of women, infants, children, and families remains an area for opportunity as 17 of the 64 objectives (26.6%) have either deteriorated or experienced no change at the time of the Midcourse Review (National Center for Health Statistics, 2016). While all nine of the objectives regarding infant care improved, none of the targets for the eight breastfeeding objectives were met, according to the most recent data available for each objective (National Center for Health Statistics, 2016). Breastfeeding is a vital public health strategy for improving infant morbidity and mortality as well as maternal morbidity outcomes (Lessen & Kavanagh, 2014). Additionally, it acts as an economic stimulant to control healthcare costs (Lessen & Kavanagh, 2014). Breastfeeding is a protective factor against childhood diseases such as obesity, respiratory infections, sudden infant death syndrome (SIDS), childhood cancers, diabetes, multiple sclerosis, and behavioral problems (Kumar & Lukman, 2019). It is also a protective factor for mothers; mothers who breastfeed are at lower risks for breast, uterine, and ovarian cancer as well as obesity-related diseases, bone loss, and postpartum depression (Kumar & Lukman, 2019). Santacruz-Salas (2019) reported that study participants who were exclusively breastfeeding at six months postpartum had significantly lower healthcare costs. With the Healthy People 2020 objectives not being met, mothers and their children are missing out on invaluable health benefits that would not only improve personal outcomes but also improve public health outcomes and economic factors. The decision to breastfeed is multifactorial and includes both personal and social factors. One factor that still remains a gray area is how maternal mental health affects the duration of breastfeeding.

Overview of the Literature

Breastfeeding

In a call to action, the Surgeon General stated that breastfeeding is one of the best methods of preventive care a mother can take for both herself and her infant, yet women consistently fail to meet the recommended one year of breastfeeding (U.S. Department of Health and Human Services, 2011). Although the benefits of breastfeeding are not only well-documented but also well-known among women and the public, U.S. mothers still do not meet Healthy People 2020 goals for breastfeeding rates and duration (Dunn et al., 2015). Women who are aware of the benefits are more likely to breastfeed, but the knowledge of how to breastfeed is also crucial (U.S. Department of Health and Human Services, 2011). Fears of low milk supply, lack of confidence in doing it correctly, pain due to improper latch of baby while breastfeeding, and the perception of it being difficult are only some of the personal barriers that prevent mothers from initiating and/or continuing to breastfeed their infants (U.S. Department of Health and Human Services, 2011). However, barriers also exist at the interpersonal, community, organizational, and policy levels as assessed using the Social Ecological Model (SEM) (Dunn et al., 2015). Breaking down these barriers, while simultaneously increasing the knowledge of specific benefits of breastfeeding, impacts mothers' likelihood to breastfeed. The good news is that evidence-based tools are readily available to policymakers, so they can provide for and promote the ramping-up of cost-effective breastfeeding initiatives (Perez-Escamilla, 2020).

Breastfeeding Benefits. Increasing the rates and duration of breastfeeding could result in a reduction of death rates among children under five years of age and in deaths among women due to breast cancer (Victora et al., 2016). From a short-term standpoint, breastfeeding results in lower infant morbidity and mortality, and in the long term, it contributes to better cognitive and

motor development among infants and children with a reduction in chronic diseases (Amitay & Keinan-Boker, 2015). In addition to benefiting infants, breastfeeding also provides benefits for moms: women who breastfeed have lower rates of uterine and ovarian cancers, and type 2 diabetes (Kumar & Lukman, 2019). On an economic level, breastfeeding mothers spend less on healthcare and formula for their newborns, which in turn affects their families (Santacruz-Salas et. al, 2019).

       Benefits for Children. The American Academy of Pediatrics (2012) recommended exclusive breastfeeding during the first six months of life as well as the continuation up to one year (and as long as both mother and baby mutually wish to do so). They stated that not breastfeeding presents health risks to children and urged pediatricians to be frontline advocates for breastfeeding (American Academy of Pediatrics, 2012). These strong statements from reputable sources signify the inherent benefits that exist for children who consume human milk for at least the first six months of life.

       Victora and colleagues (2016) documented that breastfeeding was a protective factor in childhood infections and malocclusion. Further, they also described increases in intelligence and probable decrease in overweight and diabetes. Children who were breastfed for any duration have an IQ that is on average 3.44 points higher than children who were not breastfed (Horta et al., 2015). Even 30 years later, adults who were breastfed as infants have better performance on intelligence tests (Victora et al., 2015). These increased cognitive outcomes are linked to both increasing educational attainment and higher income throughout adulthood (Victora et al., 2015).

       Breastfed preemies and infants exhibit higher immunity, dose-dependent protection against respiratory infections, lower incidence of gastrointestinal disease, reduced prevalence of childhood cancers like leukemia, and lower rates of sudden infant death syndrome (SIDS)

(Kumar & Lukman, 2019). Chondroitin sulfate, found naturally in mother's milk, protects against bacterial infections and is thought to be one reason for breastmilk being protective against necrotizing enterocolitis (Burge et al., 2019). Amitay and Keinan-Boker (2015) confirmed that children who had any duration of breastfeeding had 20% lower risk for childhood leukemia.

Even non-exclusive breastfeeding is linked to lower rates of SIDS (Kumar & Lukman, 2019). Mother's milk adapts to the needs of the infant, changing from colostrum to transitional milk, and lastly to mature milk, allowing for personalized nutrition that provides multifactorial growth support (Kumar & Lukman, 2019).

Benefits for Mothers. Breastfeeding not only presents benefits to the infant recipients of the human milk but also to the mothers who nurse. In a meta-analysis of breastfeeding benefits, Schwarz and Nothnagle (2015) found that mothers who do not breastfeed have higher health risks for breast cancer, diabetes mellitus, hyperlipidemia, hypertension, myocardial infarction, obesity, and ovarian cancer. Mothers who wean prematurely have poorer health outcomes than those who breastfeed for the recommended year (Schwarz & Nothnagle, 2015). Breastfeeding mothers who nurse their infants for 15 months or more have a lower risk of developing Multiple Sclerosis (MS) and its precursor, clinically isolated syndrome (CIS), later in life; those who breastfeed exclusively also have a decreased risk of MS symptom relapses postpartum (Langer-Gould et al., 2017).

Kumar and Lukman (2019) found that mothers who breastfeed have lower rates of breast, uterine, and ovarian cancer. For each year a mother breastfeeds, she reduces her risk of invasive breast cancer by 4% (Schwarz & Nothnagle, 2015). For those who are positive for the BRCA-1 gene, the effects are even more beneficial (Schwarz & Nothnagle, 2015). BRCA-1 positive

mothers who breastfeed for at least a year have a 37% reduction in risk for breast cancer (Schwarz & Nothnagle, 2015). When compared to their breastfeeding counterparts, mothers who never breastfed have 32% higher chances of developing ovarian cancer (Schwarz & Nothnagle, 2015).

Maternal breastfeeding is also a protective factor in bone loss, obesity-related diseases like heart disease and hypertension, and postpartum depression (Kumar & Lukman, 2019). Because producing milk requires a lot of calories, maternal obesity is reduced later in life (Schwarz & Nothnagle, 2015). This contributes to less visceral obesity (which is associated with higher health risks than subcutaneous obesity) and smaller waist measurements in later life; both of these factors are associated with lower incidence of diabetes mellitus (Schwarz & Nothnagle, 2015). Even mothers who breastfeed only one month postpartum have a lower lifelong risk for diabetes (Schwarz & Nothnagle, 2015).

In a cohort study, mothers who never breastfed were more apt to develop hypertension; these risk factors continued into menopause (Schwarz & Nothnagle, 2015). The hormones required for lactation also affect blood pressure (Schwarz & Nothnagle, 2015). According to the Women's Health Initiative, mothers who breastfeed are less likely to develop cardiovascular disease than those who do not (Schwarz & Nothnagle, 2015). It is estimated that 14,000 heart attacks per year could be prevented if 90% of mothers breastfed for one year after birth (Schwarz & Nothnagle, 2015). Peters et al. (2017) documented risk reduction for cardiovascular disease and stroke over lifetime in Chinese women who breastfed; higher duration of breastfeeding was associated with lower risk of cardiovascular disease. With heart disease being the leading cause of death of women in the U.S., the risk factors associated with not breastfeeding present

substantial areas for opportunity in public health. Breastfeeding is one modifiable factor for policy and health education.

      Breastfeeding Barriers. With the benefits of breastfeeding well-known among the medical community and among mothers, it is worrisome that breastfeeding goals are consistently not being met. Dunn and colleagues (2015) discovered that at the individual level, the largest barriers to breastfeeding were the perception of mothers' modesty being compromised by breastfeeding in public and the mental barriers created with social sexualization of breasts. Perceptions of the risk of lost modesty outweighed the perceived benefits of breastfeeding (Dunn et al., 2015). In addition, although laws exist protecting mothers' rights to breastfeed publicly and campaigns promote breastfeeding on demand, the stigmatization of public feedings still exist today (Bresnahan et al., 2019).

      In a study that examined the breastfeeding differences among military veteran mothers, results found that barriers to breastfeeding included lack of social support in family, friends, and coworkers, unsupportive work environment, and postpartum anxiety, which affects veteran mothers more than civilian mothers (Keddem et al., 2020). Racial disparities in health are also evident in breastfeeding rates: African American veterans are 48% less likely to breastfeed than White veterans (Keddem et al., 2020).

      A study in Paraguay indicated that the most prevalent barriers to breastfeeding were inadequate milk supply, insufficient desire to breastfeed by the mother, and infant rejection of nursing (Martinez Locio & Hermosilla, 2017). Free formula samples also play a role in mothers choosing not to breastfeed. The availability of an alternative to human milk makes it an option to discontinue breastfeeding not necessarily based on necessity but on want (Dunn et al., 2015).

Besides public breastfeeding stigma, other societal influences play a part in preventing mothers from initiating and/or continuing to breastfeed. Maternal body image and eating concerns also contribute. One study reported that there was a direct negative relationship between exclusive breastfeeding at six months postpartum and maternal body mass index (BMI) (pre-pregnancy) (Zimmerman et al., 2018). This relationship was attributed to body dissatisfaction, eating disorders, and concerns for child weight as well as breastfeeding self-efficacy (Zimmerman et al., 2018). The pressures that mothers face postpartum not only include those related to keeping their infants healthy but they also include societal pressures to "bounce back postpartum." These pressures can affect maternal mental health, and in turn, maternal psychological stress reduces the immunological benefits of mothers' milk (Moirasgenti et al., 2019).

Perinatal Maternal Mental Health

After birth, a significant shift in lifestyle and hormones takes place, which leads to an increase in self-criticism and a vulnerability toward postpartum depression (Brassel et al., 2019). Dysfunctional motherhood-related beliefs, especially those surrounding motherhood stigmas, fear of judgment from others, and maternal responsibility are connected to higher postpartum anxiety and postpartum depression (Fonseca et al., 2018). Even mothers who have no history of mental health issues before or during pregnancy experience changes in mental health, partly due to lack of control (perceived or true) and lack of autonomy in the perinatal period (Brassel, 2019). These emotional shifts may make women more susceptible to postpartum depression, which can affect the mother-baby bonding period with long term impacts (Brassel, 2019).

Postpartum Depression. Mothers experience high rates of depression both during pregnancy and in the perinatal period (Johnson & Padilla, 2019). Maternal depression and self-

criticism increase significantly from pregnancy to postpartum, likely due to the lack of autonomy associated with the postpartum period (Brassel et al., 2019). The prevalence of perinatal depressive episodes ranges from 10%-50% of mothers (the former referring to major episodes and the latter to minor episodes) (Kimmel, 2020). Of further concern is that mothers are underdiagnosed and rarely seek treatment for these postpartum depression episodes (Johnson & Padilla, 2019). Untreated postpartum depression is linked with impaired lactation, suicide, and infanticide (Kimmel, 2020).

Children of depressed mothers suffer consequences of these episodes. They are at higher risk for behavioral issues and cognitive skills impairment (Johnson & Padilla, 2019). There is extensive evidence in the current literature that supports the link between maternal depression and impaired ability to parent appropriately as well as poor child outcomes (Johnson & Padilla, 2019). Mothers with postpartum depression are less sensitive and responsive to their infants than their counterparts without postpartum depression (Horowitz et al., 2019). Although the long-term effects of maternal depression on children is well-documented, the short-term effects still show gaps, namely in infant outcomes and the relationship between mother and infant (Goodman, 2019).

One side effect of postpartum depression that affects infants is psychomotor retardation (Egmose et al., 2019). This slower speed to react, and namely slower speed of arm movements in mothers with postpartum depression, is linked to a decreased ability for mothers to interact with their infants (Egmose et al., 2019). Early positive interactions between mother and baby are foundational to both parties' health. Moreover, while interventions exist to curb the effects of postpartum depression on mothers and infants (like the Mother-Baby Interaction Therapy), they are not commonly used in the treatment of postpartum depression (Horowitz et al., 2019).

Postpartum Anxiety. Anxiety disorders are the most commonly diagnosed and treated mental health disorder in primary care settings with lifetime prevalence at almost 30% among Americans (Jordan & Minikel, 2019). Postpartum anxiety is more common than postpartum depression, yet frequently goes unnoticed, possibly due to the decreased perceived or true severity (Jordan & Minikel, 2019). Comorbidity for postpartum anxiety and postpartum depression is 75%, indicating the need for multifactorial screening and treatments (Rados et al., 2018). In addition to the hormonal shifts that occur after birth, lack of sleep is a contributing factor to postpartum anxiety, and sleep deprivation is rampant in new mothers (Jordan & Minikel, 2019).

Mothers with postpartum anxiety are not the only parties that experience emotional pain. Some studies indicate that babies of anxious mothers have deficits in bonding, development, temperament, behavioral issues, and breastfeeding, which are not acute (Jordan & Minikel, 2019). The dysfunctional beliefs associated with postpartum anxiety lead to avoidance tendencies, which influences mother-infant bonding (Fonseca et al., 2018). In the same way that bonding is impaired by anxiety, it also represents a protective factor in preventing maternal anxiety postpartum (Matthies et al., 2020). However, the effect of maternal anxiety on babies is sex-specific; male infants of mothers with anxiety showed vulnerability while their female counterparts did not (Reck et al., 2018). Mother-Baby Interaction Therapy is used to treat mothers with postpartum anxiety and their babies but is not yet a requisite treatment (Horowitz et al., 2019).

Purpose

Maternal mental health, namely the presence of postpartum depression and postpartum anxiety, has not been studied in-depth as it relates to the duration of breastfeeding. There have

been limited studies on the subject, some of which indicate a correlation while others indicate no correlation leading to a lack of consensus within the literature. Galbally et al. (2018) reported that among mothers taking antidepressants, those who breastfed for 12 months or longer had less depressive symptoms than those who did not breastfeed. Another study of British women found that the effect of breastfeeding on maternal depression was mediated by intention to breastfeed during pregnancy and prenatal maternal mental health (Borra et al., 2015). Then, in a study of Brazilian mothers, Falceto et al. (2004) determined there did not appear to be an association between parental mental health and breastfeeding at four months postpartum. They did, however, indicate that maternal mental health disorders, like anxiety and depression during puerperium, may have detrimental effects on the duration of breastfeeding (Falceto et al., 2004). This research is not recent, and thus there is need to revisit the subject, with an emphasis on women in the U.S.

The current literature reports some associations between mothers' mental health and breastfeeding duration, but these studies are limited. Maternal mental health has an impact on infant health and even on the quality of breastmilk, so more analysis is needed to examine not only the relationship but also how to implement interventions that address the multiple aspects of maternal mental health and breastfeeding.

Research Questions

The purpose of this study was to examine if there is a relationship between the presence of postpartum depression and/or postpartum anxiety and the duration of breastfeeding. The research questions were:

1. Is there a relationship between the presence of postpartum anxiety (IV) and the duration of breastfeeding (DV)?

2. Is there a relationship between the presence of postpartum depression (IV) and the duration of breastfeeding (DV)?

Hypotheses

Based on the review of the current literature, it was hypothesized that postpartum anxiety and postpartum depression have a negative effect on the duration of breastfeeding.

Methods

Design

A cross-sectional design was used in this study. The data used were from the 2017-2018 Centers for Disease Control and Prevention (CDC) Pregnancy Risk Assessment Monitoring System (PRAMS) surveillance system. Using G*Power Software, Version 3.1.9.4, a medium effect size of .50, an alpha level of .05, and a power of 0.80 were selected to estimate the minimum required sample size of 134 (Faul et al., 2007). The selected sample size of 252 surpassed the required minimum as calculated.

Procedures

The PRAMS surveillance system collects national and state-specific data about maternal attitudes and experiences that is not available from other sources (CDC, 2020). PRAMS is a collaboration between the CDC and 50 state health departments, covering about 83% of all births in the United States (CDC, 2018). Each participating state provides samples of about 1,300 to 1,400 women annually, using birth certificate files to identify women who have recently given birth (CDC, 2018). Participants are selected using stratified random sampling of birth records (CDC, 2018).

The two administration methods of the survey are by mail/email (self-administered) and by phone (interviewer-administered) (CDC, 2018). The mail/email method is the first point-of-contact at two months postpartum, and if there is no response after three successive mailings, potential participants are contacted via telephone for up to nine months after birth (CDC, 2018). While the question content is the same for both methods, some formatting is altered to accommodate each type (CDC, 2018). PRAMS questionnaires are available in both English and Spanish.

There are three main types of data collected as part of the PRAMS surveillance system: birth certificate data, operational data, and questionnaire data (CDC, 2018). Birth certificate data provide demographics and weighting factors as well as clinical information about mothers and infants (CDC, 2018). Operational data are obtained using the PRAMS Integrated Data System (PIDS) and are used to calculate response rates and provide quality control (CDC, 2018). Lastly, questionnaire data are self-reported and provide the affective and behavioral information about the time frames before, during, and after the most recent pregnancy (CDC, 2018).

Using the Tailored Design Method (TDM), PRAMS respondent-friendly questionnaires are distributed using multiple and varied contacts with token incentives (CDC, 2018). Each questionnaire consists of two parts: core questions that include all states and standard questions that are state-specific. Core questions cover the following topics: attitudes and feelings before, during and after the most recent pregnancy; contraceptive use; infant care; maternal care (prenatal and postnatal); insurance coverage including Medicaid and WIC participation; risk behaviors like smoking and alcohol consumption; breastfeeding; contraceptive practices; and abuse (CDC, 2018). There are currently 200 standard questions that provide more depth than the core questions on the same topics (CDC, 2018).

Participants

The current PRAMS dataset consists of 617 variables and more than 72,000 participants (CDC PRAMS Team, 2019). For this study, a sample ($n = 252$) of PRAMS data from birth years 2017 and 2018 were analyzed from one state (Maryland) that administered two optional survey questions about postpartum anxiety symptoms. The two optional questions used in this study were, "*Since your new baby was born, how often have you felt panicky?*" (M12) and "*Since your new baby was born, how often have you felt restless?*" (M21). The response options to both M12

and M21 were "Always," "Often," "Sometimes," "Rarely," and "Never" (CDC PRAMS, 2016).

The State of Arizona also administered these two optional questions but did not meet the 55%

weighted response rate threshold required by CDC for 2017 or 2018, and thus the data for

Arizona was not available (B. Morrow, personal communication June 22, 2020).

Independent and Dependent Variables

The independent variables for this study are postpartum depression and postpartum

anxiety. The dependent variable is the duration of breastfeeding.

Postpartum depression was measured using a calculated variable (VAR: POST-

PARTUM DEPRESSION INDICATOR) that took into account two five-level Likert scale

questions from the Phase 8 Core Questionnaire (2016) that address the presence of depressive

symptoms after birth. The survey variable, Core 48, asks, "*Since your new baby was born, how*

often have you felt down, depressed, or hopeless?" The response options include "Always,"

"Often," "Sometimes," "Rarely," and "Never." The next study variable, Core 49, asks, "*Since*

your new baby was born, how often have you had little interest or little pleasure in doing things

you usually enjoyed?" Response options include "Always," "Often," "Sometimes," "Rarely," and

"Never" (CDC PRAMS, 2016). If the participant answered "Always" or "Often" to either of

these questions, the calculated variable "VAR: POST-PARTUM DEPRESSION INDICATOR"

reverts to a "Yes" answer, and everyone else was assigned "No" (B. Morrow, personal

communication June 17, 2020). This variable was used to determine mothers who met the

criteria for having postpartum depression and those who do not. This method is consistent with

other screening methods for postpartum depression (Gjerdingen et al., 2009).

Postpartum anxiety was measured using two similar Likert scale questions that deal with

symptoms of anxiety since birth. These were included in the Phase 8 Standard (optional)

Questionnaire (2016) and included the survey variable, M12, which asks, "*Since your new baby was born, how often have you felt panicky?*" Response options include "Always," "Often," "Sometimes," "Rarely," and "Never." The next survey variable, M21, asks, "*Since your new baby was born, how often have you felt restless*?" Response options include "Always," "Often," "Sometimes," "Rarely," and "Never" (CDC PRAMS, 2016). A new postpartum anxiety variable was calculated (VAR: POST-PARTUM ANXIETY INDICATOR) based on the same criteria as the postpartum depression questions. If the participant answered "Always" or "Often" to either of these anxiety symptom questions, they reverted to a "Yes" score for the postpartum anxiety indicator. All others who did not give these answers were classified as "No." This calculated variable was used to determine mothers who have postpartum anxiety and those who do not and mirrors the method for postpartum depression classification.

The duration of breastfeeding was measured in weeks using an analytic variable (VAR: # WEEKS BREASTFED BABY) which was calculated based on questions that related to having ever breastfed, still breastfeeding, and how long mothers breastfed their infants. Mothers who never breastfed, breastfed for less than one week, and those who were still breastfeeding at the time of the questionnaire were removed before comparing duration of breastfeeding between each group in order to ensure continuous measurement for the dependent variable. The range of breastfeeding duration extended from one to 26 weeks.

Data Analysis

After isolating those mothers who answered a finite duration of breastfeeding, a Kolmogorov-Smirnov (K-S) test was performed for duration of breastfeeding using IBM Statistics Package for the Social Sciences Version 26 software to evaluate if the data was normally distributed ($D(252) = .153$, $p = .000$). The data distribution was determined to not be

normal, and thus nonparametric testing was used. Using a Mann-Whitney U test, duration of breastfeeding was compared for mothers who did have postpartum depression (as denoted by the analytic indicator variable) and those who did not have postpartum depression. Another Mann-Whitney U test was performed to assess duration of breastfeeding between mothers who did have postpartum anxiety (as denoted by the analytic indicator variable) and those who did not.

Results

It was hypothesized that postpartum anxiety and postpartum depression had a negative effect on the duration of breastfeeding. Frequencies, descriptive statistics, and a Mann-Whitney U test were performed to test the study hypotheses. A total of 252 mothers were sampled based on the inclusion criteria described above. As shown in Table 1 (see Appendix), most participants were married (54.4%) with the majority identifying themselves as Hispanic ethnicity (73.4%) and White race (48.2%) in the 25-29 years age group (31.0%) with at least 13 years of education (56.8%). The majority of the participants were first-time mothers (96.0%). The range of duration of breastfeeding was between one and 26 weeks with an average of 8.86 weeks ($SD =$ 5.635).

Most mothers did not meet the criteria for postpartum depression (85.3%), but the overwhelming majority did meet the criteria for postpartum anxiety (81.7%). Of the mothers who experienced postpartum depression symptoms, all (100%) had just given birth to their first child. Of the mothers who experienced postpartum anxiety symptoms, the great majority (96.1%) participated in the survey after giving birth to their first child.

Major Findings

The majority (62.7%) of all Maryland mothers reported still breastfeeding at the time of survey completion, while 9.6% reported having never breastfed and 3.0% reported less than one week of breastfeeding duration. A much larger proportion of mothers experienced symptoms of postpartum anxiety (82.3%) than symptoms of postpartum depression (12.0%).

For the first research question, "*Is there a relationship between the presence of postpartum anxiety and the duration of breastfeeding?*," a Mann-Whitney U test was used to examine the difference in breastfeeding duration between mothers with postpartum anxiety

symptoms and mothers without postpartum anxiety symptoms. No significant difference in the duration of breastfeeding between groups was found ($U = 2891.50$, $p = .422$) (see Table 2). Mothers with postpartum anxiety averaged 8.87 weeks of breastfeeding, while mothers without postpartum anxiety averaged 8.46 weeks of breastfeeding. Postpartum anxiety and breastfeeding duration appear to be independent.

For the second research question, "*Is there a relationship between the presence of postpartum depression and the duration of breastfeeding?*," a Mann-Whitney *U* test was used to examine the difference in breastfeeding duration between mothers with postpartum depression symptoms and mothers without postpartum depression symptoms. No significant difference in the duration of breastfeeding between groups was found ($U = 2741.50$, $p = .286$) (see Table 3). Mothers with postpartum depression averaged 8.10 weeks of breastfeeding, while mothers without postpartum depression averaged 8.93 weeks of breastfeeding. Postpartum depression and breastfeeding duration appear to be independent.

Discussion

Summary of Major Findings

It has been well-documented in the current literature that maternal mental health after the birth of a child has an impact on the mother, infant, and family (Jordan & Minikel, 2019; Falceto et al., 2004; Egmose et al., 2019; Gjerdingen et al., 2009). However, limited studies addressed postpartum depression as it relates to the duration of breastfeeding, and even fewer examined postpartum anxiety and how it may affect duration of breastfeeding. The purpose of this study was to determine if the presence of postpartum depression and/or postpartum anxiety had an impact on the duration of breastfeeding. After analyzing the data, it was determined that there does not appear to be a relationship between maternal mental health and breastfeeding in the sample population. Mothers with postpartum anxiety or postpartum depression had the same duration of breastfeeding as mothers who did not.

The results of this study also indicate that there is no relationship between breastfeeding duration and maternal postpartum anxiety ($p = .422$). This is incongruent with a study by Horsley and colleagues (2019), which reported that mothers who had pregnancy-specific anxiety in the first and third trimesters were less likely to exclusively breastfeed in the first and second months postpartum. They found that mothers who experienced anxiety associated with pregnancy during the third trimester had a 5-6% (OR=0.95, 95% CI [0.91, 0.99]) lower odds of breastfeeding exclusively at six to eight weeks postpartum (Horsley et al., 2019).

Further, the results of this study found no relationship between breastfeeding duration and maternal postpartum depression ($p = .286$). This is inconsistent with findings from a study by Wouk and colleagues (2017), which reported that women who had depressive symptoms at three months postpartum were less likely to have initiated or continued breastfeeding. They

found that mothers with postpartum depression symptoms have lower odds of any breastfeeding and reduced odds of exclusive breastfeeding modified by race/ethnicity (OR=0.79, 95% CI [0.70, 0.88]) (Wouk et al., 2017). These results varied by state (Wouk et al., 2017).

One possible explanation for these discrepancies is that the results for this one state (MD) are not representative of the national (U.S.) data, which aligns with the study by Wouk et al. (2017) in which state outcomes varied. Also, in categorizing the postpartum anxiety and postpartum depression variables by limited symptomology of the conditions, some mothers may be assigned a "Yes" indicator without meeting all of the criteria for the conditions. This may not necessarily be representative of the actual diagnoses of postpartum anxiety and postpartum depression. Gjerdingen and colleagues (2009) tested the validity of a two-question postpartum depression screening method and found that it was highly sensitive (100%) as a preliminary tool in identifying postpartum depression but had lower specificity (62%). The question wording mirrored those used on the PRAMS Core Questionnaire but contained yes and no answers (Gjerdingen et al., 2009). The PRAMS questionnaire differed in that it used a Likert scale in the answer choices ("Always," "Often," "Sometimes," "Rarely," and "Never"). The Likert scale may have impacted the categorization of mothers with and without maternal mental health issues.

Study Limitations

There are a number of limitations to this study. The first limitation is a lack of available data. While there are questions pertaining to anxiety and anxiety symptoms in the Phase 8 Standard Questionnaire, many do not specifically ask about the period since the birth of the child (CDC, 2016). Because stigma is a major factor in seeking treatment (Moore et al., 2019), the questions that specifically ask about diagnosis may not be representative of all mothers suffering from anxiety. There are two questions that ask about postpartum anxiety symptoms, but only two

states chose to administer them with one (Arizona) not meeting the reporting criteria (CDC, 2016; B. Morrow, personal communication June 22, 2020). The only data available to assess postpartum anxiety symptoms were from Maryland, which may not be representative of the entire population of mothers. The data were not normally distributed, requiring nonparametric tests to be conducted with less power than their parametric counterparts. The distribution could have been affected by the fact that only one state could be analyzed. More questions are needed pertaining to postpartum anxiety symptoms on the next phase of the Core Questionnaire, especially considering high prevalence of anxiety in this population.

The second limitation is the measure used to collect the data. The PRAMS Phase 8 Core Questionnaire contains four questions that pertain to maternal mental health, all of which specifically pertain to depression or depressive symptoms (CDC, 2016). There are additional questions about depression in the optional Standard Questionnaire, but some questions group depression and anxiety together into one category, making it difficult to assess them independently (e.g. "*Since your new baby was born, have you participated in any of the following? - Counseling for depression or anxiety, Support group for depression or anxiety?*") (CDC, 2016). Isolating anxiety and depression as independent choices in these question/answer sets would make it easier to assess each variable independently.

Other limitations associated with the measure used to collect data lie in the measurement of breastfeeding duration. The PRAMS questionnaire is administered about two to four months after the birth of a child. Incentives, such as coupons, raffles, postage, baby items, cash, and picture frames, are offered to participating mothers. If there is no response, subsequent mailings are sent and phone calls are conducted for up to nine months after birth (B. Morrow, personal communication June 17, 2020). Once the participant responds, they are no longer contacted for

follow-up. Due to each participant possibly completing the instrument at varied intervals, it is difficult to standardize the data that pertain to duration of breastfeeding. On the Core Questionnaire, Question 36 states, "*Are you currently breastfeeding or feeding pumped milk to your new baby?*" If the respondents answer "Yes," then they are directed to skip the proceeding question (number 37) that asks for duration of breastfeeding ("*How many weeks or months did you breastfeed or feed pumped milk to your baby?*") (CDC PRAMS, 2016). For the purpose of this study, those who did not answer a numerical value for the duration of breastfeeding were not selected; 60.0% of mothers reported still breastfeeding at the time of the questionnaire completion and thus, could not be measured as continuous because they did not answer Question 37. The true full breastfeeding duration of these mothers cannot be assessed using this methodology until after termination of breastfeeding due to how the question is worded on the PRAMS questionnaire. Follow-ups would be beneficial in assessing long-term outcomes.

Another limitation associated with how the data were measured lies in partial versus exclusive breastfeeding. This study was able to evaluate the duration of breastfeeding, but not the dose of breastfeeding (partial versus exclusive). All breastfeeding questions were worded in a way that did not differentiate between exclusive and non-exclusive breastfeeding (CDC, 2016). Many of the breastfeeding health benefits for both mother and child are dose-dependent (Kumar & Lukman, 2019), so this information would be useful in determining extent of involvement of the variables.

Recall bias may also have been an issue in this study. In any questionnaire, recall bias can play a factor in participants' responses. Fear of judgment or repercussions could keep participants from answering questions honestly, especially those pertaining to mental health.

Stigma still exists surrounding mental health, and that stigma is a barrier in accessing treatment and in reporting (Moore et al., 2019).

The last limitation of this study is the self-report nature of the data gathered. The Core Questionnaire contains four questions about the duration of breastfeeding, one of which asks, "*How many weeks or months did you breastfeed or feed pumped milk to your baby?*" (CDC, 2016). There may be error in these answers, especially among mothers who completed the questionnaire much later than when they weaned. Those who answered in months were recoded into weeks in the dataset, and some may have been inadvertently inaccurate. Mothers may report a full month (due to rounding) when they only breastfed for a partial month.

Public Health Implications

While this study did not show a relationship between maternal mental health and the duration of breastfeeding, it did highlight the overwhelming presence of postpartum anxiety symptoms in new moms. Over 80% of study participants reported having felt anxious or panicky often or always since the birth of their child. Screening for postpartum anxiety is not as common as screening for postpartum depression. A study by Matthies and colleagues (2018) reported that maternal-fetal attachment is a protective factor for postpartum anxiety symptoms. Coo and colleagues (2018) reported positive evidence surrounding a group intervention targeting maternal mental health and mother-infant interactions. They found a clinically significant reduction in postpartum anxiety symptoms ($p = .05$) after an Emotional Wellbeing Group intervention (Coo et al., 2018). Public health efforts can be focused, first, on more consistent screening for postpartum anxiety and second, on reducing the prevalence of postpartum anxiety symptoms through encouraging bonding between infant and mothers. While breastfeeding duration does not appear to be affected by postpartum anxiety, anxiety symptoms can be affected by intentional

mother-infant bonding. One way to strengthen the bond between infant and mother is through breastfeeding (Johnson, 2013).

There are many policies and intervention strategies in place to encourage breastfeeding, but not many interventions aimed specifically toward mothers with mental health struggles. *The CDC Guide to Strategies to Support Breastfeeding Mothers and Babies* (2013) focuses on policy and environmental interventions to increase collaboration at all levels of partnership in order to overcome the barriers to breastfeeding. However, there are no interventions listed that make any mention of maternal mental health, postpartum depression, or postpartum anxiety. More health education interventions are needed to address both maternal mental health and breastfeeding. Public health efforts have made great impact in the diagnosis of postpartum depression but more is needed in the realm of interventions.

Current research supported that targeting mother-baby interactions can be beneficial in treating maternal mental health issues (Coo et al., 2018). However, there have been limited sample sizes in these studies. More widespread randomized controlled trials are needed to support the need for interventions targeting maternal mental health through mother-baby bonding, specifically through breastfeeding. Public health (in addition to mothers and infants) will benefit from more studies on not only the prevalence of maternal mental health struggles but also on how to treat maternal mental health and the negative impacts on in families. New mothers have unique needs that may not be addressed well with generalized mental health interventions. There is ample room for research, and the need is well-documented in this and other studies.

Conclusion

In conclusion, this study and the current available literature support the need for additional widespread research on the impact of maternal mental health on breastfeeding practices. While some studies addressed mental health as a barrier to initiating breastfeeding, others examined the likelihood of exclusive breastfeeding in relation to maternal mental health. This study investigated the presence of postpartum depression and/or postpartum anxiety and duration of breastfeeding, albeit limited in reach due to the parameters of the dataset. Further research should be conducted on postpartum anxiety prevalence, the impact it has on mothers and infants, and how it impacts breastfeeding in new mothers.

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Appendix: Demographics and Analysis Tables

Table 1

Demographics Characteristics of 2017-2018 PRAMS Respondents from Maryland (n=252)

Variable	*n*	%	*M*	*SD*
Duration of Breastfeeding (in weeks)			8.86	5.635
Birth Order				
1st child	242	96.0		
2nd child	10	4.0		
Hispanic Ethnicity				
Yes	185	73.4		
No	67	26.6		
Marital Status				
Married	137	54.4		
Other (not married)	115	45.6		
Maternal Age (Grouped)				
<= 17 years	5	2.0		
18-19 years	8	3.2		
20-24 years	45	17.9		
25-29 years	78	31.0		
30-34 years	65	25.8		
35-39 years	40	15.9		
40+ years	11	4.4		
Maternal Race				
White	119	48.2		
Black	74	30.0		
Other non-White	32	13.0		
Mixed race	10	4.0		
Other Asian	8	3.2		
Chinese	3	1.2		
Filipino	1	.4		

Variable	n	%	M	SD
Maternal Years of Education				
0-8 years	18	7.1		
9-11 years	27	10.7		
12 years	64	25.4		
13-15 years	72	28.6		
>=16 years	71	28.2		
Postpartum Anxiety (PPA)				
Yes	206	81.7		
No	41	16.3		
Postpartum Depression (PPD)				
Yes	29	11.5		
No	215	85.3		

Note. The range for duration of breastfeeding was from one to twenty-six weeks. PPA is categorized as Yes when participants answered either *Often* or *Always* to at least one of the two questions (Standard M12 and Standard M21) regarding postpartum anxiety symptoms. PPD is categorized as Yes when participants answered either *Often* or *Always* to at least one of the two questions (Core 48 and Core 49) regarding postpartum depression symptoms.

Table 2

Results of Mann-Whitney U Test for Postpartum Anxiety (PPA) and Duration of Breastfeeding

PPA	n	Mean Rank	Sum of Mean Ranks	U	Z-score	P value
No	41	115.91	4752.50	3891.50	-.803	.422
Yes	206	125.61	25875.50			

Table 3

Results of Mann-Whitney U Test for Postpartum Depression (PPD) and Duration of Breastfeeding

PPD	n	Mean Rank	Sum of Mean Ranks	U	Z-score	P value
No	215	124.25	26713.50	2741.50	-1.066	.286
Yes	29	109.53	3176.50			